

Categorizing Public Conversation on Vaccine Opposition to Inform Health Communications Strategies

Introduction

The evolving landscape of vaccine-related public discourse presents challenges and opportunities for the public health community. In an era marked by rapid information spread, valid health information can reach the general public more easily and broadly than ever before.¹ However, this ever-changing environment also allows vaccine hesitancy, opposition, and misinformation to do the same, with it often spreading faster than accurate content.² This overabundance of information, also known as an infodemic during a disease outbreak, places pressure on health entities to ensure that individuals receive the correct information on vaccines to protect community health.³

Vaccine opposition is not a new phenomenon; skepticism, resistance, and negative sentiments have persisted since the first smallpox vaccine.⁴ Vaccine opposition exists on a spectrum of beliefs, ranging from strong support and trust in vaccines to complete opposition, with various nuanced positions in between. While its manifestation has changed over time, the COVID-19 pandemic and the widespread development of social media platforms have significantly influenced its spread and narratives. Historically, vaccine opposition has been influenced by a variety of factors, including cultural beliefs, trust in health authorities, misinformation, and individual health concerns.^{5,6} The global impact of the COVID-19 pandemic and the rapid development of mRNA vaccines, coupled with the unprecedented scale of information dissemination and the intertwining of public health decisions with political and ideological beliefs, has amplified fears and introduced new dimensions to vaccine skepticism.^{7,8,9} A surge in vaccine opposition has complicated the public health response to COVID-19 and undermined confidence in all vaccines.^{10,11}

Understanding and addressing vaccine opposition now requires a nuanced approach that considers these new dynamics and the shifting landscape of public opinion. Since 2019, The Public Good Projects (PGP) has monitored conversation about vaccines across a variety of social and digital media platforms to help create targeted interventions and communication strategies for public health challenges. This report leverages PGP's advanced media monitoring platforms and expertise in vaccine opposition to categorize narratives into patterns. These patterns can help health communicators plan messaging approaches and strategies to improve vaccine uptake.



Methods

Data were collected using PGP's media monitoring platforms, which leverage keyword searches created by a team of analysts. The search query included hundreds of keywords related to vaccines, organized into complex Boolean strings. Analysts regularly revise queries to align with evolving public discussions and to eliminate irrelevant content. The data gathered from these searches come from publicly accessible sources, meaning anyone using an internet search can access this information. To identify discussions around vaccine opposition, PGP analysts manually examined a sample of 1,000 posts across various social media platforms and forums, identifying common and recurring phrases, hashtags, and language that are typically associated with opposition and negative sentiments toward vaccines.¹² From this, analysts constructed a detailed list of keywords that are indicative of vaccine opposition. The list is regularly reviewed and updated to ensure its accuracy. To differentiate between conversation about COVID-19 vaccines and discussions about other types of immunizations, such as routine childhood vaccines, analysts then created separate subthemes containing either specific keywords and phrases related to the pandemic (e.g., COVID-19 vaccine, coronavirus, etc) or terms pertaining to routine vaccines (e.g., MMR, polio vaccine, childhood immunization). This approach enabled analysts to categorize public discourse by different types of vaccines.

Analysts used multiple methods to identify patterns in conversation over the past year, including examining top content by engagement, conversation spikes and the content driving those spikes, and the most frequently used hashtags within conversation on social media platforms. This analysis approach provided insights into the patterns and themes underpinning conversation. From this, analysts identified three distinct patterns within public discourse on vaccine opposition: 1) cyclical or anticipatory narratives, which can be anticipated ahead of time based on historical trends, 2) non-cyclical recurring narratives that resurface periodically but without a predictable pattern, and 3) unanticipated narratives that emerge suddenly without connection to events or previous narratives.

Results

This section provides more information on the narratives found within each of the patterns identified by analysts.

Cyclical or Anticipatory Narratives

Public discourse around vaccines is influenced by periodic and seasonal events, which tend to spark an uptick in questions, concerns, opposition, and misinformation. Importantly, the predictable nature of these events allows health communicators to plan and develop targeted campaigns, preemptively address common misconceptions, and deploy resources more effectively to counteract vaccine opposition before it spreads.

Regular meetings of health organizations, advisory committees, or regulatory agencies

Meetings such as those held by the [Advisory Committee on Immunization Practices](#) (ACIP) play a crucial role in shaping vaccine policies. But in part because the meetings are public and accessible online, they can also trigger opposition. Data presented on slides during the meeting can be distorted, misrepresented, and taken out of context. For instance, in 2023, some social media posts distorted ACIP's findings to incorrectly claim that COVID-19 vaccines are unnecessary for teens; suggesting vaccines prevent few deaths but cause 100,000-200,000 adverse



effects, misrepresenting the vaccines' safety and efficacy. In reality, experts in the ACIP meeting explained that CDC data shows that teens are statistically the least likely to die from the virus, but vaccines still prevent teens from hospitalization from COVID-19. And the “severe adverse effects” mentioned by social media users referred to redness, swelling, and other common reactions. These types of details and context, however, are often left out of vaccine opposition posts responding to regulatory meetings.

Flu season

Conversation about flu vaccinations rise during the respiratory virus season, peaking in fall and winter before waning in spring and summer. Opposition often includes exaggerated, unconfirmed claims of adverse events like fatalities and strokes, false allegations that COVID-19 was rebranded as the flu, and unfounded claims about mRNA technology used in flu vaccines. Posts have also claimed that flu vaccines are ineffective or that home remedies work better than vaccines. Comparisons of Vaccine Adverse Event Reporting System (VAERS) rates between flu and COVID-19 vaccines are common, fueling arguments against the safety of COVID-19 vaccines. As RSV vaccines become more established, opposition to them may also align with these seasonal trends.

New vaccine releases or updates

When new vaccines are released or updated, vaccine opposition often includes false rumors that new or updated vaccines were hastily prepared and poorly tested. Social media posts also claim, without evidence, that alterations in vaccine schedules are driven by pharmaceutical company profit. Both of these narratives are often observed in conversation about COVID-19 vaccines. In addition, concerns and skepticism towards mRNA technology, fueled by COVID-19 vaccine discussions, can spill over to influence negative sentiment about newer vaccines like RSV.

Annual health campaigns or immunization awareness weeks

Health entities and community organizations often use events like National Infant Immunization Week, World Immunization Week, and back-to-school campaigns to promote vaccination. Negative comments and reactions to posts by health entities or community organizations often increase engagement and drive conversation during these times. Organizations posting during these events should anticipate this in response to their content and be prepared to see statements about personal beliefs regarding vaccinations, opinions, and misinformation in the comment section of posts.

Non-cyclical Recurring Narratives

Some conversations may arise unexpectedly but represent recurring narratives established in prior discourse. Despite the unpredictability of this content, the narratives underlying these incidents often follow similar patterns as previous content on the same theme. These patterns enable health communicators to plan and anticipate responses, improving their capacity to manage vaccine opposition.

Celebrity illnesses or deaths

When celebrities become sick or die, opposition discourse often links their health issues—without evidence—to vaccines (particularly COVID-19 vaccines). High-profile cases that were debunked in 2023 included allegations about Jaime Foxx's [rumored](#) blindness and paralysis and Bronny James's [hospitalization](#) due to cardiac



arrest. Despite viral social media posts claiming otherwise, neither of these incidents had any connection to COVID-19 vaccines.

Outbreaks of vaccine-preventable diseases

During and after disease outbreaks, vaccine opposition posts often feature an array of false claims, including: that vaccines or vaccinated individuals cause the outbreaks vaccines aim to prevent; that outbreaks are fabricated to boost vaccination rates or pharmaceutical profits; that vaccine-preventable diseases are not a serious concern; and that herd immunity is preferable to vaccination. Despite thorough debunking, these claims often pop up anytime a new outbreak emerges. During the 2023-2024 measles outbreaks, opposition posts also included false claims that the MMR vaccine caused the outbreak or that immigrant populations were responsible for the uptick in cases. New COVID-19 variants also often spur unsubstantiated claims that vaccines are ineffective against whatever variant is circulating.

High-profile announcements or warnings

High-profile announcements or warnings from health organizations or governments, such as a safety signal detection through a health advisory network or a change in vaccination guidance, often trigger upticks in opposition. Claims may suggest that new health guidelines signify incompetence or malintent rather than the natural result of evolving science. These concerns can manifest as distrust towards health entities for not addressing a potential safety risk sooner. Announcements may also trigger distrust about vaccine efficacy or safety, with some individuals overstating effects as more widespread than reported or arguing that the risks of vaccination outweigh their benefits. In reality, safety signal detections are an example of vaccine monitoring systems in action, and the CDC continues to recommend COVID-19 vaccines because the benefits far outweigh the risks across age groups.

Document releases

The release of documentation from health entities, political bodies, or pharmaceutical companies often drives claims that information was hidden from the public or that organizations conspired against people to harm them. This is particularly true when documents are released after Freedom of Information Act requests. In the past year, document releases prompted allegations—most of which were unsubstantiated and lacked context—that the COVID-19 pandemic originated from a lab leak, that organizations and governments censored anti-vaccine voices, and that government emails disclosed hidden vaccine side effects.

Legal actions or lawsuits related to health

Legal actions or lawsuits initiated against pharmaceutical companies often become content for vaccine opposition by amplifying perceived risks associated with vaccines or suggesting misconduct by vaccine manufacturers. Discourse can also focus on the idea that any legal action against vaccine manufacturers confirms that all vaccines are harmful. Examples of leading posts seen over the prior year included arguments that because vaccine manufacturers are protected from lawsuits through the National Childhood Vaccine Injury Act, they must be hiding something or do not have the public's interest in mind.



Legislation changes, debates, and political events

Political events or legislative changes related to health and vaccination can become hotspots for vaccine opposition, often including conspiracy theories about government overreach and misunderstandings of laws surrounding vaccine mandates. Within COVID-19, conversation frequently frames vaccine mandates as excessive government control. Content from domestic and global hearings debating vaccine laws or statements from public officials also garner attention. Within routine vaccine discourse, leading conversations focus on immunization requirements for school, and some of the outrage toward COVID-19 vaccine requirements has transitioned into opposition toward all required vaccinations.

Medical studies or health reports

Medical studies, clinical trials, or health reports can become a source of opposition when posts misinterpret or misrepresent findings. Research discussing myocarditis risks, strokes in older adults following flu and COVID-19 vaccinations, and pediatric seizures post-vaccination has been misconstrued and misinterpreted to challenge the overall safety of COVID-19 vaccines. Older studies and clinical trials may also be misrepresented to claim that clinical trials were insufficient or improperly conducted, invalidating safety and efficacy findings. Non-peer-reviewed preprints, flawed studies, or predatory journals can also create an “evidence base” founded on misinformation and exploit the public’s trust in research. Because these “studies” often carry an air of authority, they are used to legitimize otherwise unfounded claims.

Selected adverse events and general safety concerns

Social media posts often highlight the potential for adverse events following vaccination, portraying rare occurrences like myocarditis post-vaccination as more severe and more common than they are. These posts also ignore the fact that myocarditis is more common after a COVID-19 infection than after vaccination. Other social media posts falsely claim that COVID-19 vaccines cause adverse events like cancer and fertility issues even though these myths have been consistently debunked. Similar narratives falsely link vaccines to ADHD, autism, death, or sudden infant death syndrome. These discussions are often found alongside broader claims that COVID-19 and routine vaccines are harmful, despite the fact that experts agree vaccines are key to saving lives.

Alternative treatments

Vaccine opposition posts also sometimes promote alternative, inadvisable treatments for diseases like Ivermectin and Hydroxychloroquine (HCQ), as well as unproven herbal remedies and supplements such as the “flu bomb.” Despite evidence disproving their effectiveness against COVID-19 and other diseases, these treatments are often claimed to have been suppressed in order to prioritize vaccines under emergency use authorizations. Conversations this past year also focused on the malaria vaccine, with false claims promoting alternative treatments instead of life-saving vaccines.

Unanticipated Narratives

Discussions within this category often originate from posts without a clear source or connection to ongoing events or previous mainstream narratives. These instances unexpectedly gain traction and rapidly spread opposition to vaccines. These posts may be a one-time occurrence or resurface at random. Discussions in this category



encompass a broad range of allegations. Within COVID-19 conversation in the past year, examples of unanticipated narratives included false claims about public figures being bribed by vaccine manufacturers and the use of misleading and edited visuals or statements to argue that companies are engaging in dangerous research practices for profit. Historical events are also sometimes referenced, such as a resurfaced story from 1996 about a meningitis vaccine trial in Nigeria. In these instances, vaccine opposition claims surfaced randomly, spread widely, but faded quickly.

It is important to note that some claims start in this category and evolve into persistent topics in public discussions. One notable example is the false [claim](#) around contamination of Simian Virus 40 (SV40) in COVID-19 vaccines, which emerged as a new topic in 2023 and has since persisted in public discussions. This claim is now associated with conversations around lawsuits, politics, routine adverse events, and general safety concerns. This category highlights the critical need for ongoing monitoring of vaccine-related conversation to detect shifts and trends in public sentiment.

Conclusion

Vaccine opposition is not static; it is an evolving ecosystem filled with variations of concerns and narratives. Focusing on the underlying patterns and overarching themes (rather than individual statements) can help health communicators update and use existing messaging to combat narratives and allow for more targeted planning for future messaging. Understanding the current conversation patterns and narratives is crucial for anticipating periods of heightened vaccine opposition and developing materials or interventions to address concerns and misconceptions. Continuous monitoring and analysis are essential to stay up to date on the latest narratives and in order to support public health communicators in better combatting vaccine opposition in the future.



Endnotes

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